

## PEER REVIEW HISTORY

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### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Thinker, soldier, scribe: cross-sectional study of researchers' roles and author order in the Annals of Internal Medicine
<b>AUTHORS</b>	Perneger, Thomas; Poncet, Antoine; Carpentier, Marc; Agoritsas, Thomas; Christophe, Combescure; Gayet-Ageron, Angele

### VERSION 1 - REVIEW

<b>REVIEWER</b>	Armen Yuri Gasparyan Departments of Rheumatology and Research & Development, Dudley Group NHS Foundation Trust (Teaching Trust of the University of Birmingham, UK)
<b>REVIEW RETURNED</b>	06-Sep-2016

<b>GENERAL COMMENTS</b>	<p>This is a well designed study that may be of interest to expert in publication ethics. It once again emphasize the importance of quantitative reporting of author contributions to properly credit authors.</p> <p>Specific comments.</p> <ol style="list-style-type: none"><li>1. Page 5, lines 30-42. It is unclear why Annals of Internal Medicine, but not BMJ, Lancet, or any other leading journal, was chosen for the analysis. It would be appropriate to justify the choice of the journal in the Introduction and explain why articles published in 2015 were examined (why not 2014 or previous years).</li><li>2. Also, it is necessary to explain why narrative reviews, editorials, case reports and letters were not included in the analysis. It is often difficult to understand who did what in 'non-research' articles.</li><li>3. There are some missing references that closely relate to the topic of the study. It would be appropriate to analyze them in the Discussion: J Med Ethics. 2013 Aug;39(8):509-12. doi: 10.1136/medethics-2012-100568 Rheumatol Int. 2013 Feb;33(2):277-84. doi: 10.1007/s00296-012-2582-2</li><li>4. In the Author Contributions sections of the manuscript authors did not add point on 'responsibility of all authors for all aspects of the study and writing'. It would be correct to adhere to the ICMJE 4 criteria of authorship.</li></ol>
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<b>REVIEWER</b>	Bernadette Bartlam Lecturer Health Services Research Research Institute for Primary Care and Health Sciences Keele University Keele Staffordshire ST5 5BG UK
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<b>REVIEW RETURNED</b>	25-Oct-2016
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<b>GENERAL COMMENTS</b>	A very interesting contribution, well written and concise.
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<b>REVIEWER</b>	Elizabeth Wager, Publications Consultant Sideview, Princes Risborough, UK
<b>REVIEW RETURNED</b>	16-Nov-2016

<b>GENERAL COMMENTS</b>	<p>This study looked at research articles published in the Annals of Internal Medicine and analysed author contributions (as stated in the journal) in relation to author order. The study contributes to our understanding of the usually unwritten conventions about author order.</p> <p>The article is clearly written. The introduction provides the background to the study question and clearly describes primary and secondary outcomes. It's also nice to see a power calculation and a completed STROBE checklist (which may explain why the study is so well reported)!</p> <p>The results are presented clearly. The study limitations are well addressed. Appropriate references have been cited.</p> <p>Specific suggestions</p> <p>(1) In the abstract it would be helpful to explain where the information about author contributions came from. This is well explained on p5 in the main article.</p> <p>(2) I am not a statistical expert and am unfamiliar with some of the techniques used (eg varimax rotation and tetrachoric correlation) so I hope one of the other reviewers will comment on the appropriateness of these. I therefore found Table 3 hard to interpret.</p> <p>(3) On p8, l 51: "The papers were signed by 1139 authors" – this seems an odd expression to use as authors rarely sign their work. Perhaps it would be better to say that 1139 authors were listed on the 119 papers. Similarly on p.9, line 42, you could just write 108 articles "with 5 or more authors" (rather than "signed by")</p>
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<b>REVIEWER</b>	Magne Nylenna Norwegian Institute of Public Health, University of Oslo, Norway
<b>REVIEW RETURNED</b>	24-Nov-2016

<b>GENERAL COMMENTS</b>	<p>Authorship and the order of authors is a continuous topic for discussion and controversies in medical publishing. The basic authorship requirements, set by the International Committee of Medical Journal Editors (ICMJE), are widely accepted but most of the debate on the order of authors etc has been based more on opinion than on data. A study on the characteristics of different «authorships» is therefore most welcome.</p> <p>This is a highly relevant paper with interesting findings. The study is</p>
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	<p>nicely performed and the manuscript well written. From my point of view just some minor revisions are needed:</p> <p>Introduction: The criterium «acquisition of data» to the ICMJE authorship requirements was not added in 2003 but in May 2000 (at a meeting in Copenhagen). The latest addition to the requirements (of August 2013) could be mentioned in the introduction; a new criterion to emphasize each author's responsibility to stand by the integrity of the entire work: "Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved."</p> <p>Methods: The last sentence under «Outcome variables» should rather read: «Finally we defined author profile scores based on an exploratory factor analysis of the author contributions». The number «three» should be regarded as a result.</p> <p>Results: Figure 1 is a bit confusing. Given three evaluable authorship criteria one would expect the three bars to represent either each of the three criteria or a cumulative result of the first, the first and the second and at last all three – not a combination of these representations.</p> <p>Discussion: The lack of (and need for?) an international taxonomy for contributorship could be discussed. How well defined are the 10 contributions of the Annals? The role as «corresponding author» as compared to first author, second author and last author has neither been explored nor discussed. Why?</p>
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<b>REVIEWER</b>	Lorenz Risch labormedizinisches zentrum Dr. Risch, Switzerland
<b>REVIEW RETURNED</b>	06-Dec-2016

<b>GENERAL COMMENTS</b>	<p>Perneger and colleagues evaluate authors' contributions to scientific articles published in an important medical journal (i.e. the Annals of Internal Medicine) utilizing standardized reports for authors' contributions. They find that first, second, and last authors of research articles made distinct contributions to published research. Further, they found three authorship profiles that can be used to summarize author contributions: thinker, soldier, and scribe. The article is original, employs appropriate statistical methods, and is very well written. The topic of the article is very important, because individual evaluation of researchers often is done based on the position of authors on the author list, despite a lack of common sense, how positions on author lists should be attributed to individual researchers. In this perspective, this article sheds light on the organization of clinical research teams, at least on those being lucky enough to have an article published in the Annals of Internal Medicine. All authors fulfilled all 3 ICMJE criteria for authorship. I consider some issues to be addressed:</p> <p>Major comments: 1.) Methods, independent variables: author classes. In my eyes, there are 3 prominent author positions. First, last and corresponding authors. It would have been interesting to see data on the role of corresponding authors, especially for those not being first or last author.</p>
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	2.) Methods, independent variables, degrees: Did the authors consider double degrees as a separate category, such as MD/PhD or MD MPH? Of note: in the author list of the present article by Perneger and colleagues, only the first and last authors have a double degree.
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<b>REVIEWER</b>	Changyong Feng Department of Biostatistics and Computational Biology University of Rochester USA
<b>REVIEW RETURNED</b>	03-Jan-2017

<b>GENERAL COMMENTS</b>	<p>(1) The sample size calculation on p.7 does not make any sense. How can you assume the correlation between the authors is 0? In the first paragraph of the "Introduction", they summarized the roles of the first author and the last author in medical science. Can you imagine that they are uncorrelated? Even if the correlation is 0, how is the sample size based on the difference of the contributions of the first authors and the last authors related to the number of papers you need to review in the study? It is clear they try to make some number in order to satisfy the requirement of sample size justification by the journal, no matter whether the number is relevant or not.</p> <p>(2) It's clear that the comparisons on Table 1 is based on the the "uncorrelatedness" assumption discussed above.</p> <p>(3) There are many comparisons Table 1. Control the overall type I error is another issue.</p>
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### VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Armen Yuri Gasparyan

This is a well designed study that may be of interest to expert in publication ethics. It once again emphasize the importance of quantitative reporting of author contributions to properly credit authors.

Specific comments.

1. Page 5, lines 30-42. It is unclear why Annals of Internal Medicine, but not BMJ, Lancet, or any other leading journal, was chosen for the analysis. It would be appropriate to justify the choice of the journal in the Introduction and explain why articles published in 2015 were examined (why not 2014 or previous years).

Authors: We state in the introduction “We selected this journal because it uses an explicit and detailed contribution reporting format” and provide a more comprehensive explanation just below in the 2nd paragraph of Methods.

We used 2015 because we were interested in current practice, but other sampling strategies could have been used. This is now added on page 5, end of 2nd paragraph of Methods.

2. Also, it is necessary to explain why narrative reviews, editorials, case reports and letters were not included in the analysis. It is often difficult to understand who did what in 'non-research' articles.

Authors: We did not include such publications as the current list of contributions cannot fully apply to

them : some contributions may be irrelevant (e.g. collection of data), while others would be ignored (e.g. participating in a guideline panel). We explain the inclusion criteria in Methods, 1st paragraph (page 5). We have added note in the Discussion (page 13, 1st paragraph)

3. There are some missing references that closely relate to the topic of the study. It would be appropriate to analyze them in the Discussion:

J Med Ethics. 2013 Aug;39(8):509-12. doi: 10.1136/medethics-2012-100568  
Rheumatol Int. 2013 Feb;33(2):277-84. doi: 10.1007/s00296-012-2582-2

Authors: we have added these references (no 21 and 22), see Discussion page 12, top paragraph. The main topic of these papers is unjustified authorship, which is not the main topic of our study, therefore we keep the mention brief.

4. In the Author Contributions sections of the manuscript authors did not add point on 'responsibility of all authors for all aspects of the study and writing'. It would be correct to adhere to the ICMJE 4 criteria of authorship.

Authors: good catch! We have added the fourth criterion.

Reviewer: 2

Reviewer Name: Bernadette Bartlam

A very interesting contribution, well written and concise.

Authors: thank you; no modification required.

Reviewer: 3

Reviewer Name: Elizabeth Wager

This study looked at research articles published in the Annals of Internal Medicine and analysed author contributions (as stated in the journal) in relation to author order. The study contributes to our understanding of the usually unwritten conventions about author order.

The article is clearly written. The introduction provides the background to the study question and clearly describes primary and secondary outcomes. It's also nice to see a power calculation and a completed STROBE checklist (which may explain why the study is so well reported)!

The results are presented clearly.

The study limitations are well addressed.

Appropriate references have been cited.

Specific suggestions

(1) In the abstract it would be helpful to explain where the information about author contributions came from. This is well explained on p5 in the main article.

Authors: we have added this information

(2) I am not a statistical expert and am unfamiliar with some of the techniques used (eg varimax rotation and tetrachoric correlation) so I hope one of the other reviewers will comment on the appropriateness of these. I therefore found Table 3 hard to interpret.

Authors. As the statistical techniques are described in the Methods section, we have simplified the table header, and added an explanation of factor loadings in Methods (page 8, 2nd paragraph).

(3) On p8, l 51: “The papers were signed by 1139 authors” – this seems an odd expression to use as authors rarely sign their work. Perhaps it would be better to say that 1139 authors were listed on the 119 papers. Similarly on p.9, line 42, you could just write 108 articles “with 5 or more authors” (rather than “signed by”)

Authors: thank you, we have made these changes

Reviewer: 4

Reviewer Name: Magne Nylenna

Authorship and the order of authors is a continuous topic for discussion and controversies in medical publishing. The basic authorship requirements, set by the International Committee of Medical Journal Editors (ICMJE), are widely accepted but most of the debate on the order of authors etc has been based more on opinion than on data. A study on the characteristics of different «authorships» is therefore most welcome.

This is a highly relevant paper with interesting findings. The study is nicely performed and the manuscript well written. From my point of view just some minor revisions are needed:

Introduction:

1. The criterium «acquisition of data» to the ICMJE authorship requirements was not added in 2003 but in May 2000 (at a meeting in Copenhagen). The latest addition to the requirements (of August 2013) could be mentioned in the introduction; a new criterion to emphasize each author's responsibility to stand by the integrity of the entire work: “Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.”

Authors: we have corrected the date and added the new criterion (bottom of page 4)

Methods:

2. The last sentence under «Outcome variables» should rather read: «Finally we defined author profile scores based on an exploratory factor analysis of the author contributions». The number «three» should be regarded as a result.

Authors: we agree, and have modified the sentence as suggested (page 6)

Results:

3. Figure 1 is a bit confusing. Given three evaluable authorship criteria one would expect the three bars to represent either each of the three criteria or a cumulative result of the first, the first and the second and at last all three – not a combination of these representations.

Authors: we have modified the figure to represent each of the 3 criteria, and the conjunction of all three (last page).

Discussion:

4. The lack of (and need for?) an international taxonomy for contributorship could be discussed. How well defined are the 10 contributions of the Annals?

Authors: We agree that this would be very useful, and have added this in the Discussion (page 13, next to last paragraph).

5. The role as «corresponding author» as compared to first author, second author and last author has neither been explored nor discussed. Why?

Authors: The Annals do not indicate a Corresponding author but provide an author's address under the heading "Requests for single reprints". Because 2 reviewers asked for this information we identified these authors. Of the 119 articles, 3 referred to a website for reprints, and one article provided 2 author names. Of the 117 identified authors, 94 (80.3%) were first authors, 19 (16.2%) were last authors, and 4 (3.4%) were in-between. So this role is really confounded with that of the first author. Because the label "Requests for single reprints" is unusual and ambiguous, we would prefer to leave this information aside.

Reviewer: 5

Reviewer Name: Lorenz Risch

Perneger and colleagues evaluate authors' contributions to scientific articles published in an important medical journal (i.e. the Annals of Internal Medicine) utilizing standardized reports for authors' contributions. They find that first, second, and last authors of research articles made distinct contributions to published research. Further, they found three authorship profiles that can be used to summarize author contributions: thinker, soldier, and scribe. The article is original, employs appropriate statistical methods, and is very well written. The topic of the article is very important, because individual evaluation of researchers often is done based on the position of authors on the author list, despite a lack of common sense, how positions on author lists should be attributed to individual researchers. In this perspective, this article sheds light on the organization of clinical research teams, at least on those being lucky enough to have an article published in the Annals of Internal Medicine. All authors fulfilled all 3 ICMJE criteria for authorship. I consider some issues to be addressed:

Major comments:

1.) Methods, independent variables: author classes. In my eyes, there are 3 prominent author positions. First, last and corresponding authors. It would have been interesting to see data on the role of corresponding authors, especially for those not being first or last author.

Authors: see response to reviewer 4, point 5. There were only 4 instances of an author to be contacted for reprints who was neither first nor last.

2.) Methods, independent variables, degrees: Did the authors consider double degrees as a separate category, such as MD/PhD or MD MPH? Of note: in the author list of the present article by Perneger and colleagues, only the first and last authors have a double degree.

Authors: in this version of the paper, we did not. There were many permutations of degrees; in decreasing frequency: MD only (411), PhD only (216), MD and master (175), master only (135), MD and PhD (98), none or other (64), PhD and master (32), MD, PHD and master (8). If we disregard master's degrees, there were 199 authors without a doctorate, 248 with a PhD, 586 with an MD, and 106 with both. It would be tempting to show the relationship between the degrees and author contributions and author ranks, but this would add another table, and is not exactly on topic. We suggest to leave this out, but if the editors and/or reviewer decide otherwise we will add this information.

Reviewer: 6

Reviewer Name: Changyong Feng

(1) The sample size calculation on p.7 does not make any sense. How can you assume the

correlation between the authors is 0? In the first paragraph of the "Introduction", they summarized the roles of the first author and the last author in medical science. Can you imagine that they are uncorrelated? Even if the correlation is 0, how is the sample size based on the difference of the contributions of the first authors and the last authors related to the number of papers you need to review in the study? It is clear they try to make some number in order to satisfy the requirement of sample size justification by the journal, no matter whether the number is relevant or not.

Authors: while it is unlikely that correlations between authors in their contributions are exactly zero, it is much harder to put a realistic number on them before the study is done. On the one hand, authors' contributions might be positively correlated (e.g., a statistically oriented paper may have several authors who contributed statistical expertise, and a more qualitative paper will have none), but negative correlations are just as likely, since work can be distributed among authors, and what is done by one needs not be done by another. But to give substance to the debate, we have obtained Spearman correlation coefficients between the contributions of first authors and last authors (only the first named was retained in case of shared ranks):

- 1) Conception and design of the study 0.147, 2) Analysis and interpretation of the data 0.124, 3) Drafting of the article 0.154, 4) Critical revision of the article for important intellectual content 0.046, 5) Final approval of the article -0.024, 6) Provision of study material or patients 0.074, 7) Statistical expertise 0.047, 8) Obtaining of funding 0.105, 9) Administrative, technical, or logistic support 0.141, 10) Collection and assembly of data -0.016.

In light of these results, assuming zero correlation was reasonable.

Secondly, we were specifically interested in differences between authors defined by their ranks (e.g., first versus last author). Since there is one first author and one last author in each paper (with few exceptions), the number of papers defines the number of available pairs, and is therefore relevant. Finally, we describe how we reasoned in designing the study. We cannot change that now.

(2) It's clear that the comparisons on Table 1 is based on the the "uncorrelatedness" assumption discussed above.

Authors: It is not. We allowed for clustering of authors within papers. See methods, page 7, beginning of statistical analysis: We computed the proportion of authors who reported each contribution, overall, and by author position on the byline. The comparison of ranks was tested using a logistic regression model with mixed effects, where the author contribution was the dependent variable, the article was a random factor, and author rank was the fixed factor

(3) There are many comparisons Table 1. Control the overall type I error is another issue.

Authors: there are 10 tests in Table 1, and all of them were planned a priori, since these are they key variables of the study. All p-values are highly significant, and even if we had applied a Bonferroni correction all would have remained significant. Seeing the pattern of the data globally, we do not believe that a true null hypothesis accompanied by a rash of type 1 errors is a reasonable explanation for these results. We would be comfortable removing the p-values from the table, but then some readers are likely to ask what the p-values are. We kept the p-values in the table, but leave it to the editor to decide if they should be taken out.

#### VERSION 2 – REVIEW

<b>REVIEWER</b>	Dr Elizabeth Wager Sideview, UK
<b>REVIEW RETURNED</b>	03-Feb-2017

<b>GENERAL COMMENTS</b>	Something missing from the sentence "In light of this analysis, we suggest that contributorship has the best potential to represent the roles scientists who conduct clinical research in a transparent manner" perhaps you mean the roles OF scientists
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<b>REVIEWER</b>	Magne Nylenna Norwegian Institute of Public Health and University of Oslo, Norway
<b>REVIEW RETURNED</b>	07-Feb-2017

<b>GENERAL COMMENTS</b>	This was a nice paper on a relevant topic in the first place, and after revision I think it is acceptable for publication
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<b>REVIEWER</b>	Lorenz Risch labormedizinisches zentrum Dr. Risch AG, 3097 Liebefeld, Switzerland
<b>REVIEW RETURNED</b>	03-Feb-2017

<b>GENERAL COMMENTS</b>	The authors satisfactorily answered my comments. Thank you. Regarding the association of author position and degrees, I still would be very interested to see this sub-analysis, because in my view it further characterizes the three different roles (thinker, scribe, soldier) and /or author positions. However, it remains up to the editor to decide whether this analysis should be reported. Since BMJ open is an online journal, space constraints should not be too much of a concern.
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### VERSION 2 – AUTHOR RESPONSE

Reviewer 5:

The authors satisfactorily answered my comments. Thank you. Regarding the association of author position and degrees, I still would be very interested to see this sub-analysis, because in my view it further characterizes the three different roles (thinker, scribe, soldier) and /or author positions. However, it remains up to the editor to decide whether this analysis should be reported. Since BMJ open is an online journal, space constraints should not be too much of a concern.

Authors: we have added a Table 5 with the requested analyses. We have also added a sentence in the Methods (bottom page 8), a paragraph in Results (bottom page 11), and in the Discussion (middle page 13).

Reviewer 3:

Something missing from the sentence "In light of this analysis, we suggest that contributorship has the best potential to represent the roles scientists who conduct clinical research in a transparent manner" perhaps you mean the roles OF scientists

Authors: thank you, we have completed the sentence (indeed 'of' was missing)

### VERSION 3 – REVIEW

<b>REVIEWER</b>	Dr Elizabeth Wager Sideview, Princes Risborough, UK
<b>REVIEW RETURNED</b>	12-Apr-2017

<b>GENERAL COMMENTS</b>	The authors have responded to the reviewer comments and the article looks ready for publication.
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<b>REVIEWER</b>	Lorenz Risch labormedizinisches zentrum Dr. Risch AG Waldeggstrasse 37 3097 Liebefeld Switzerland
<b>REVIEW RETURNED</b>	03-Apr-2017

<b>GENERAL COMMENTS</b>	My comments have been satisfactorily addressed. Thank you very much.
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